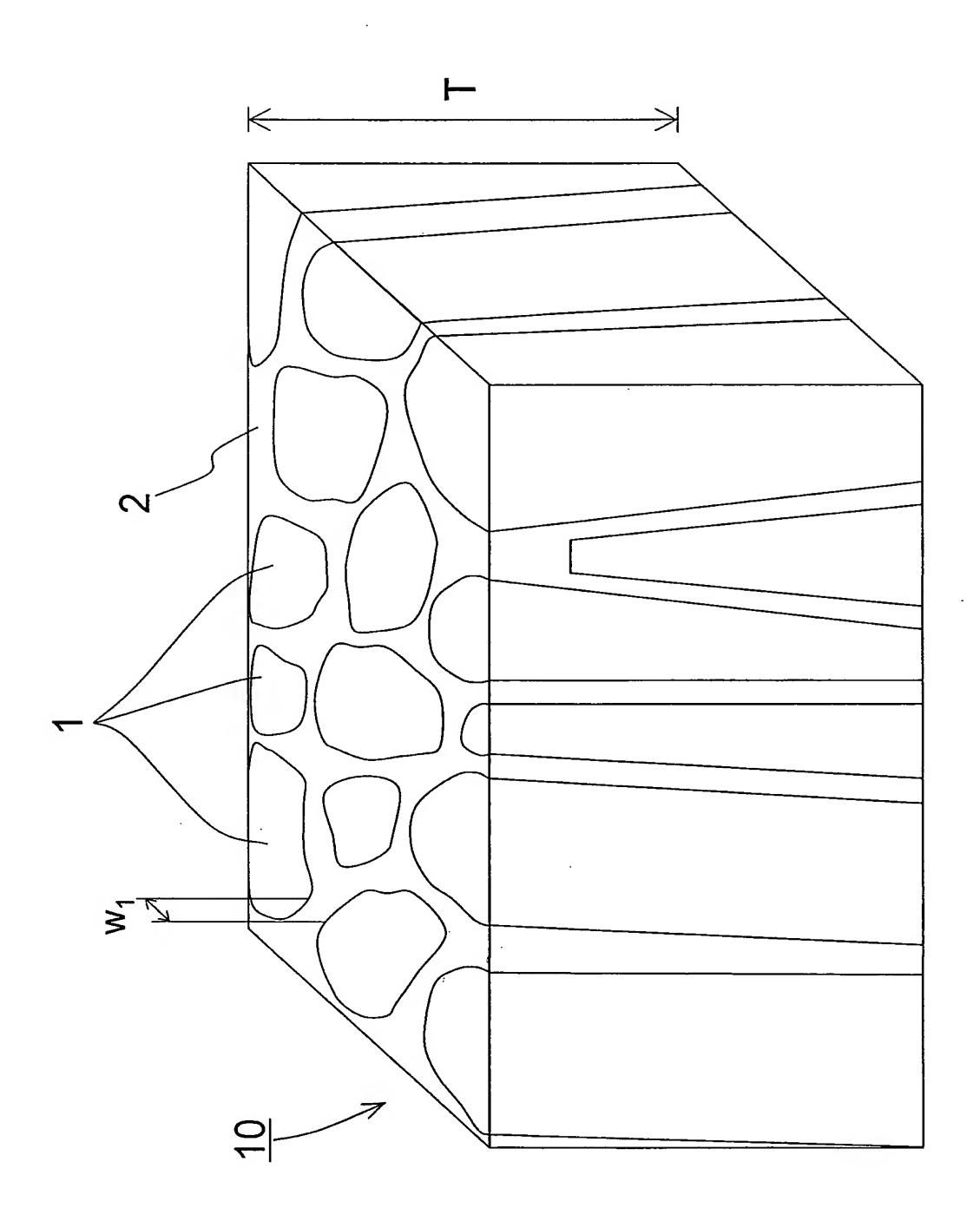
Inventor: IWAMURA
Docket No.: 14434.112USWO
Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,
AND MEMBER USING THE THIN FILM
Attorney Name: Douglas P. Mueller
Phone No.: 612.455.3804
Sheet 1 of 18

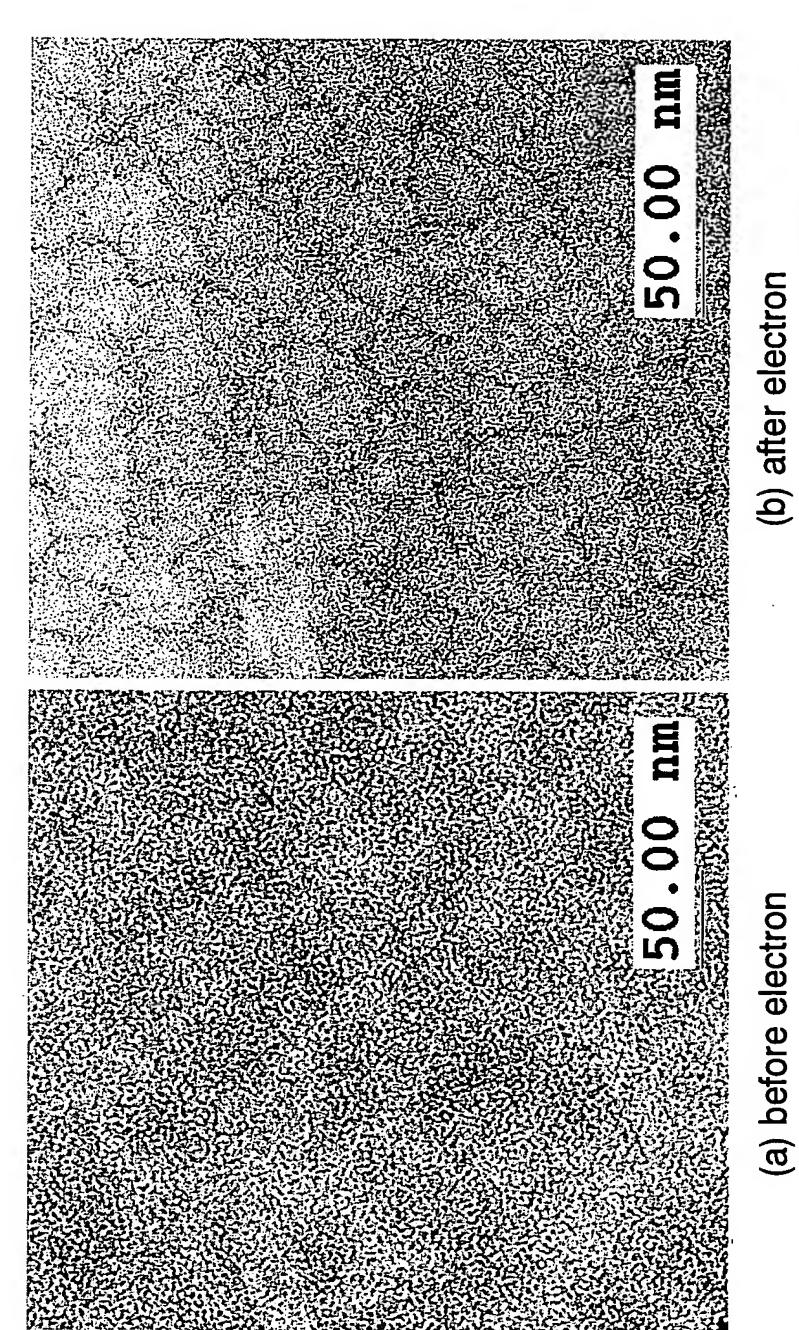


Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller

Phone No.: 612,455.3804 Sheet 2 of 18



beam irradiation after electron **Q** 

beam irradiation

Inventor: IWAMURA

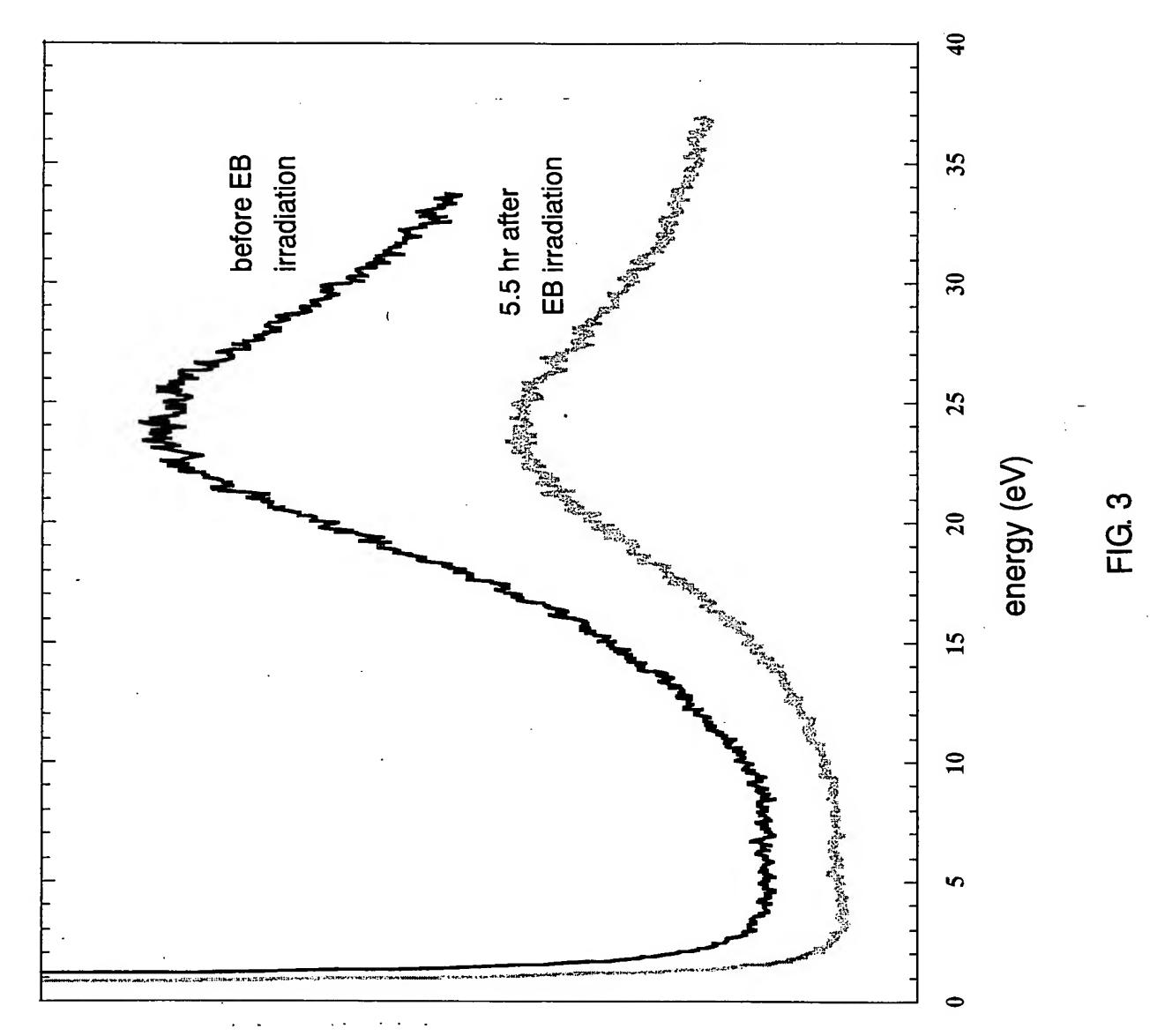
Docket No.: 14434,112USWO

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 3 of 18



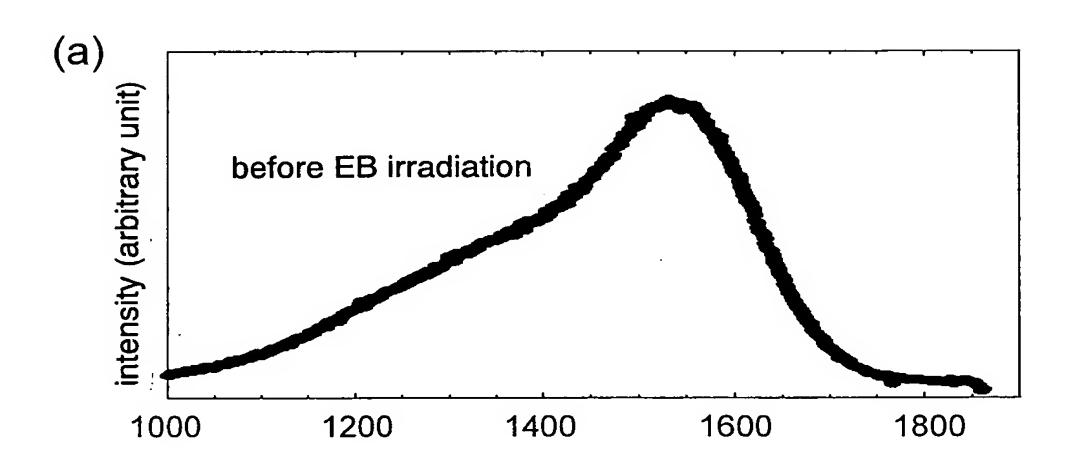
absorption intensity (arbitrary unit)

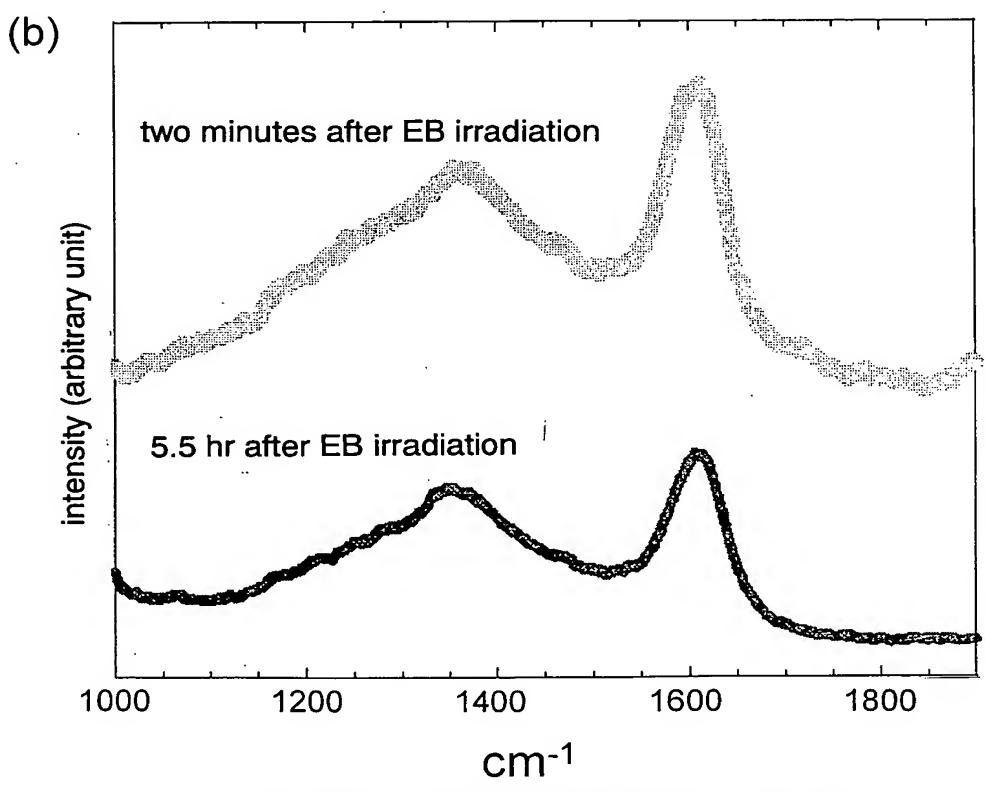
Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM Attorney Name: Douglas P. Mueller

Phone No.: 612.455.3804

Sheet 4 of 18





amorphous carbon film formed in 15mTorr mixed gas containing Ar and methane

FIG. 4

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller

Phone No.: 612.455.3804 Sheet 5 of 18

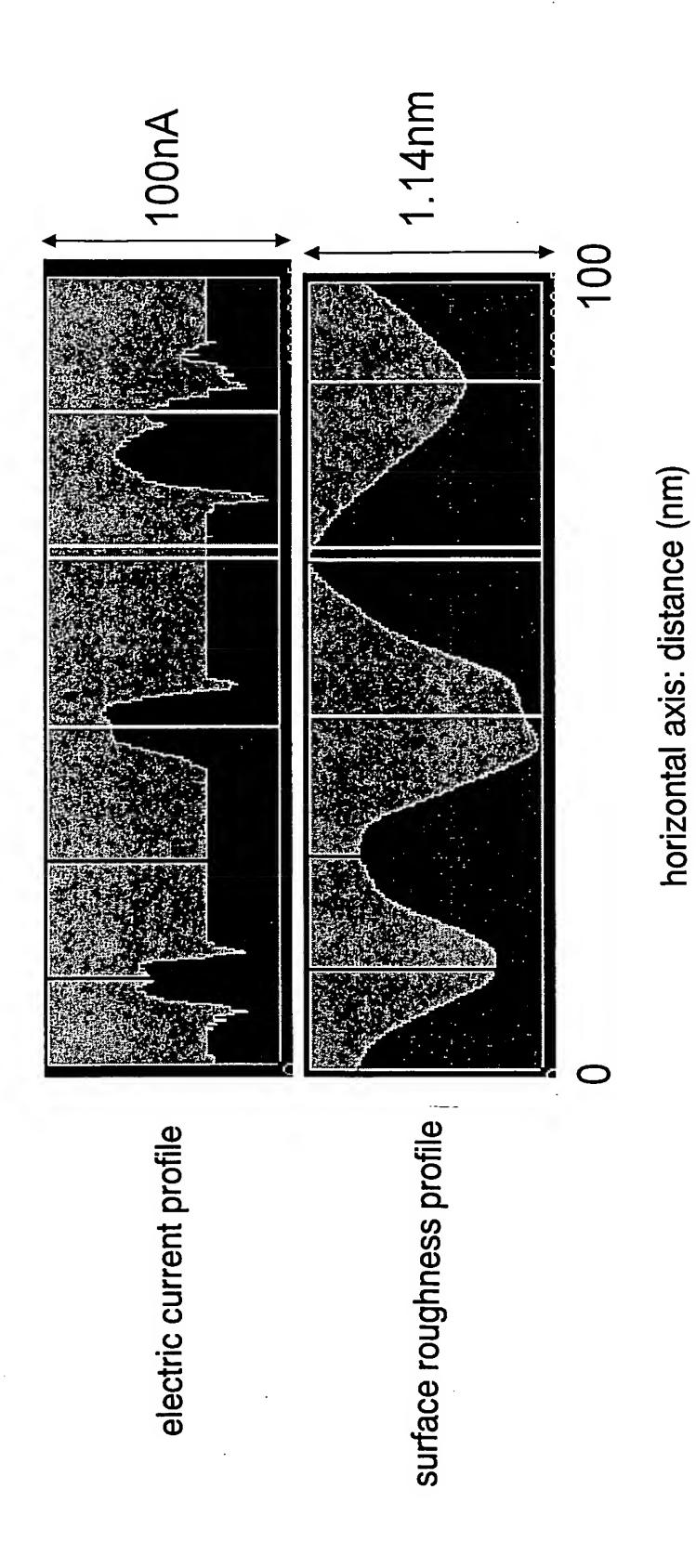


FIG. 5

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 6 of 18

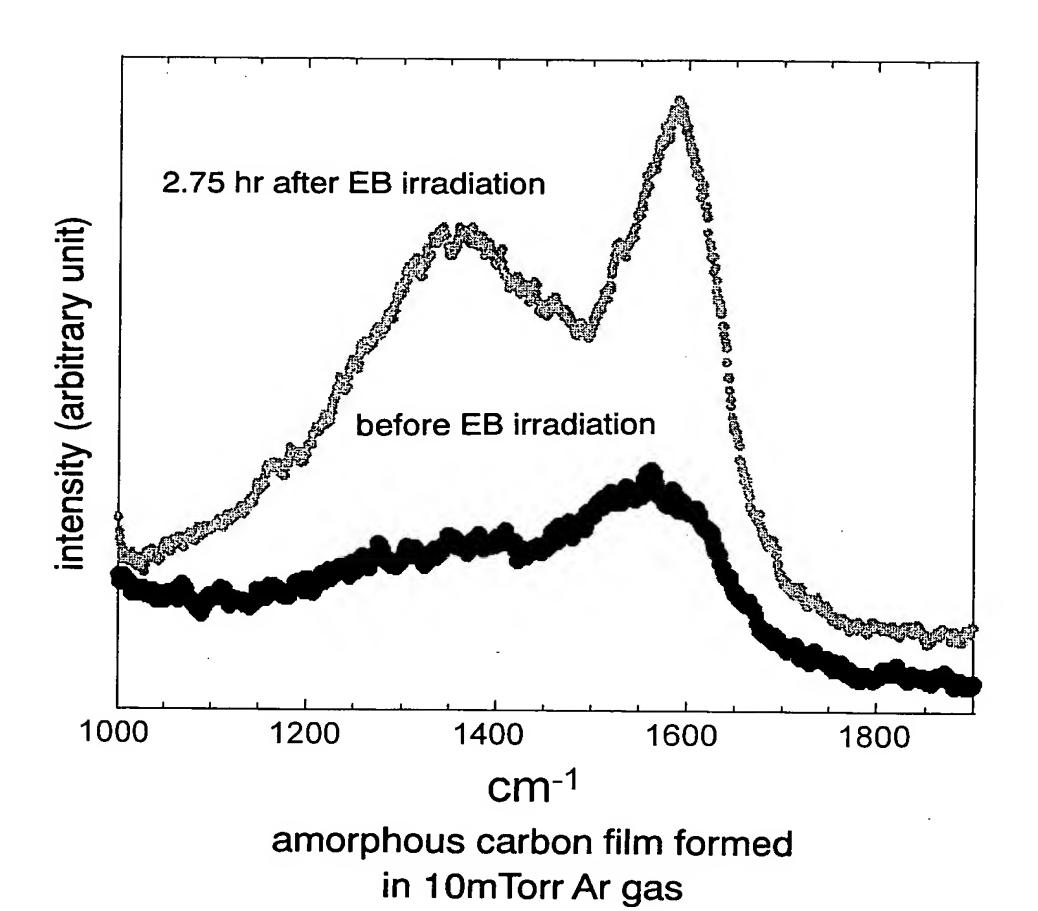
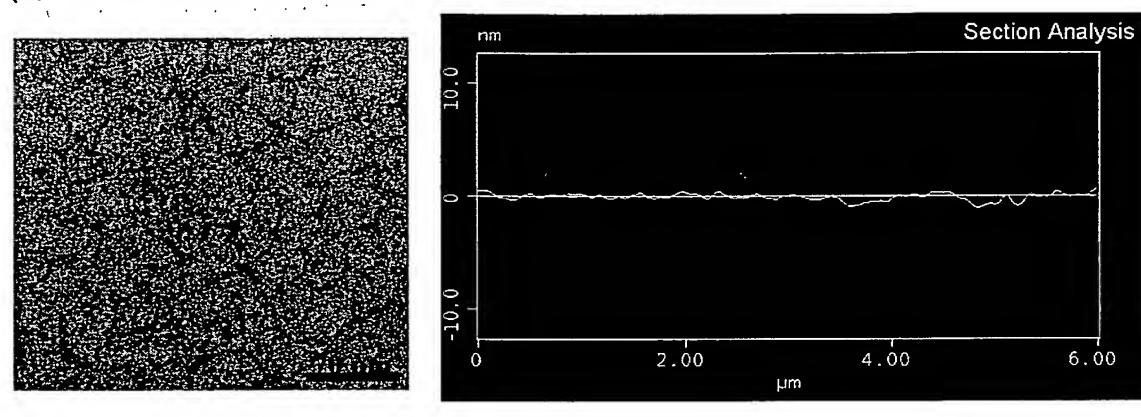


FIG. 6

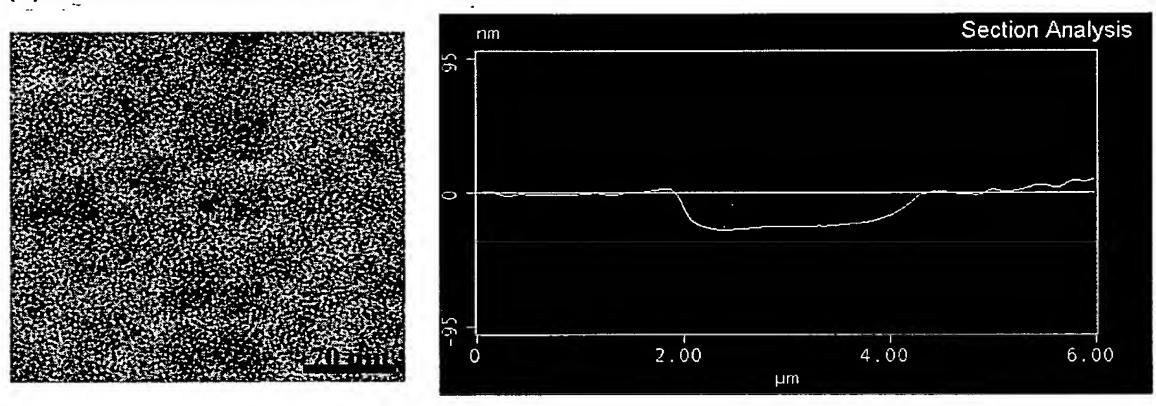
Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME, AND MEMBER USING THE THIN FILM Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 7 of 18

#### (a) after electron beam irradiation

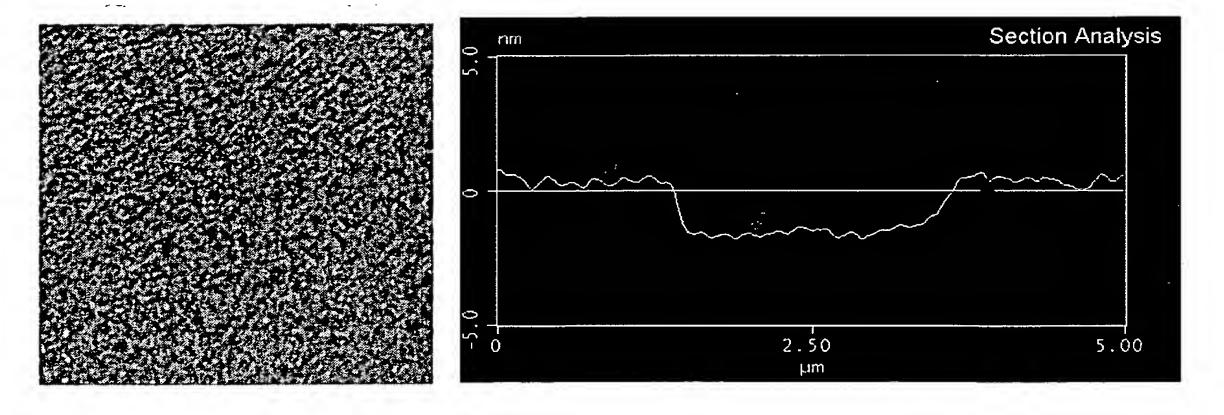


### (b) before electron beam irradiation



6.00

#### (c) sputtered a-C film



Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 8 of 18

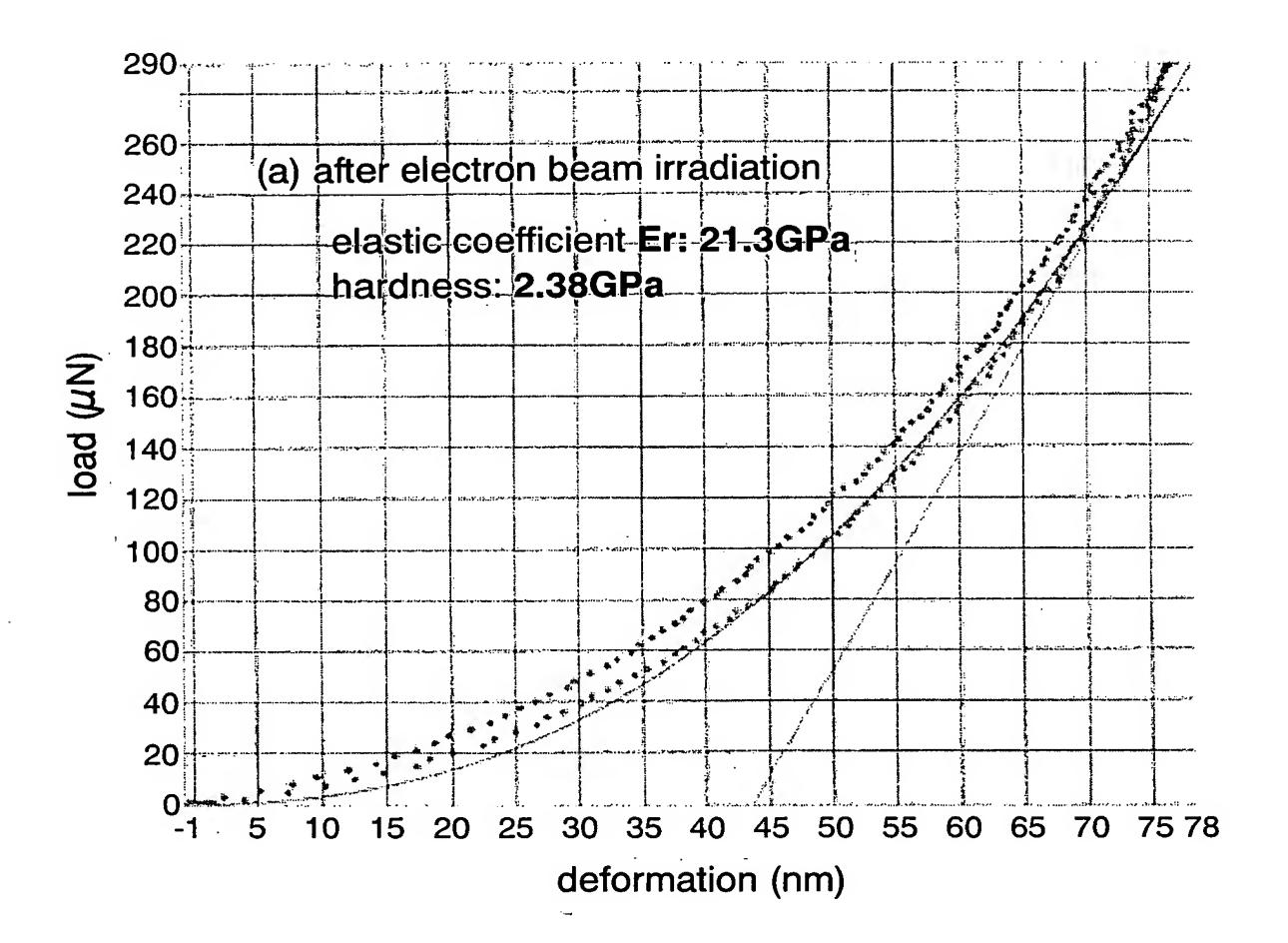


FIG. 8A

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller

Phone No.: 612.455.3804 Sheet 9 of 18

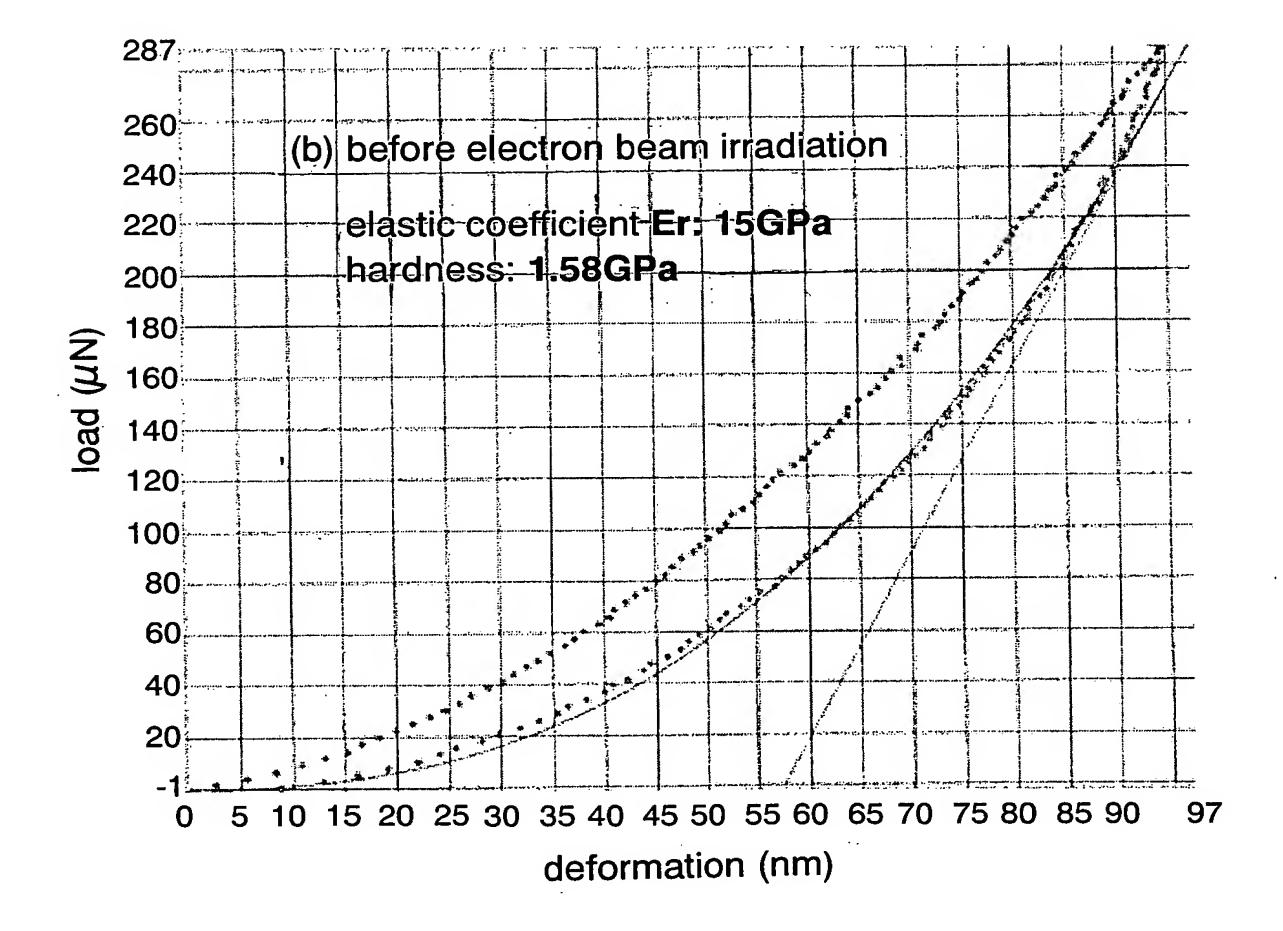


FIG. 8B

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller

Phone No.: 612.455.3804 Sheet 10 of 18

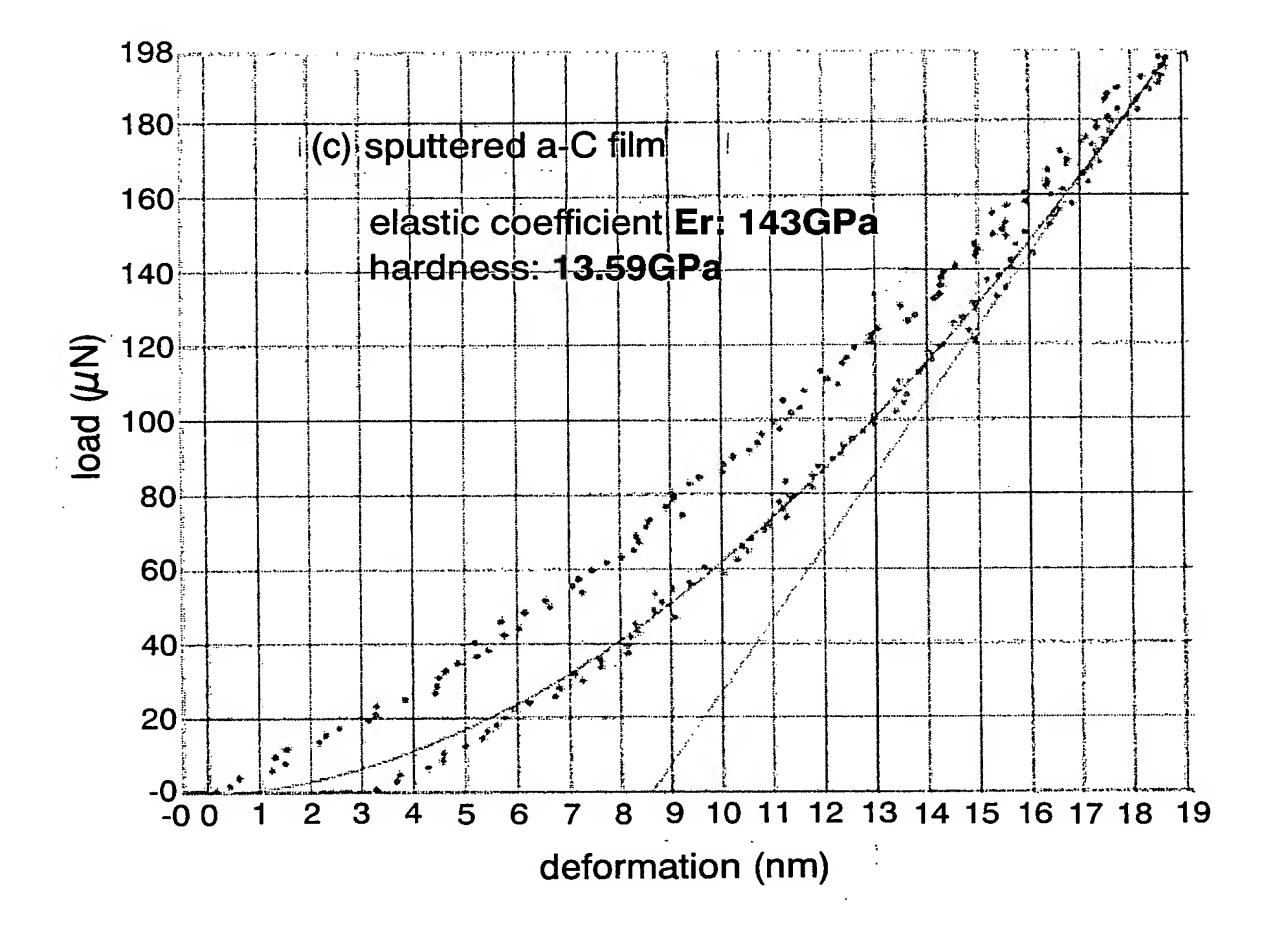


FIG. 8C

Inventor: IWAMURA

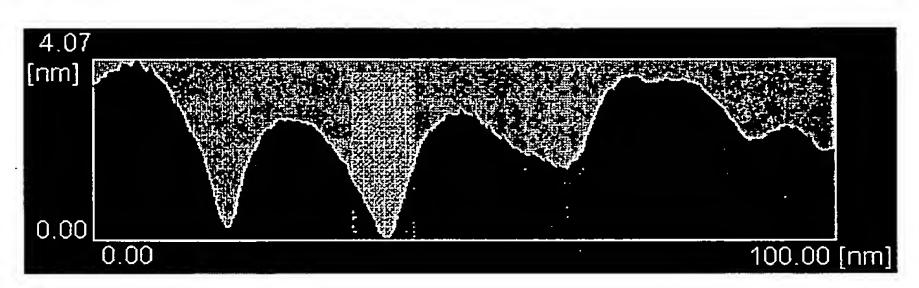
Docket No.: 14434.112USWO

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804 Sheet 11 of 18

#### (a) surface unevenness



### (b) cos image

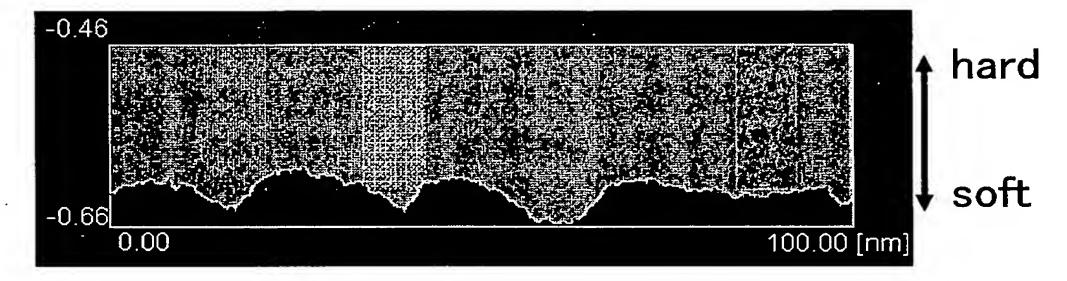


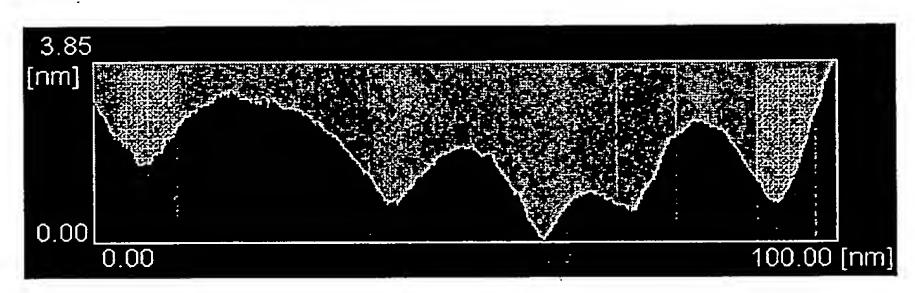
FIG. 9

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME, AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 12 of 18

## (a) surface unevenness



# (b) cos image

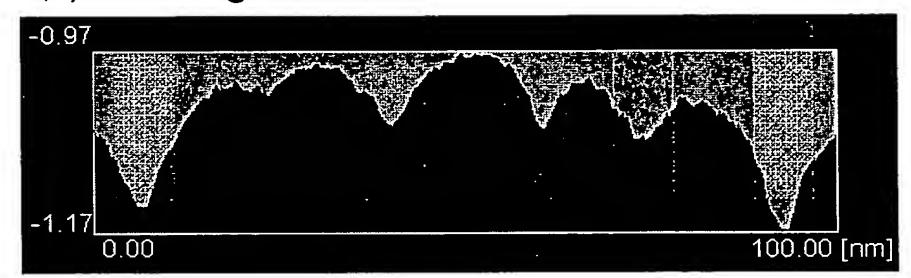


FIG. 10

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 13 of 18

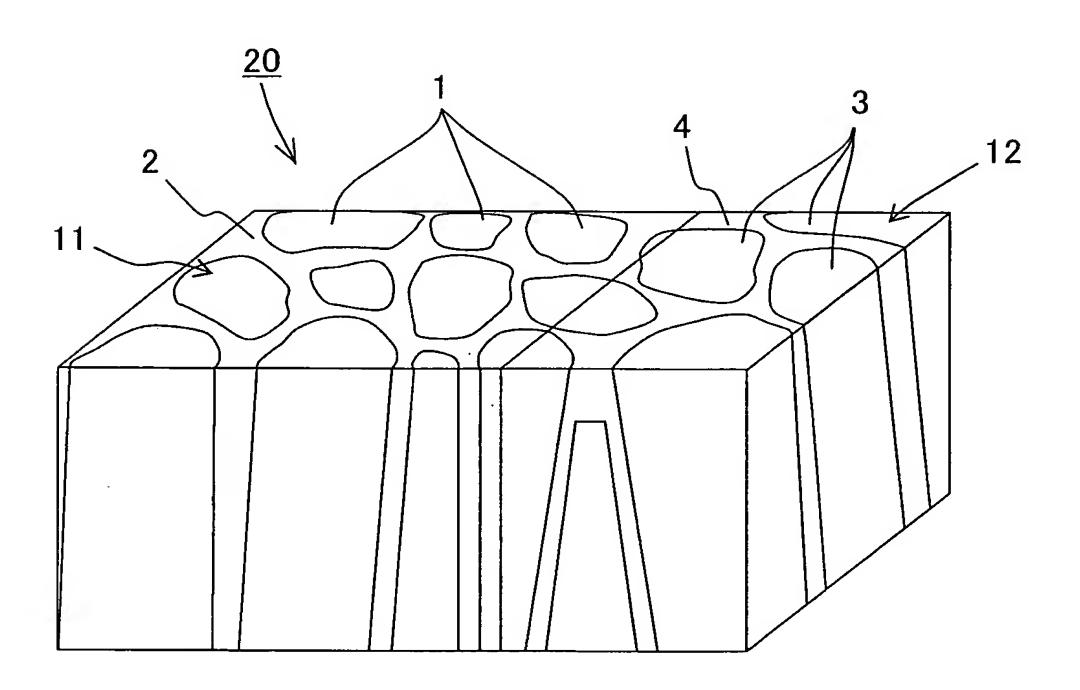


FIG. 11

Inventor: IWAMURA

Docket No.: 14434.112USWO Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804 Sheet 14 of 18

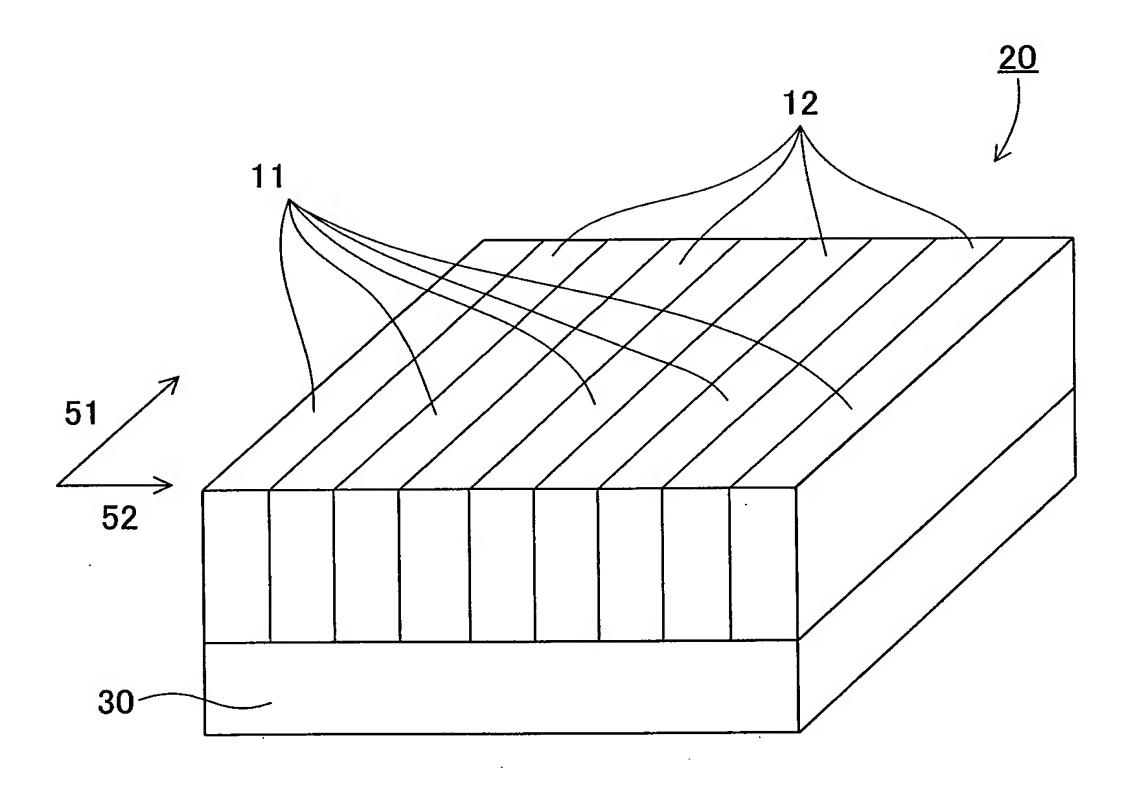


FIG. 12

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME, AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 15 of 18

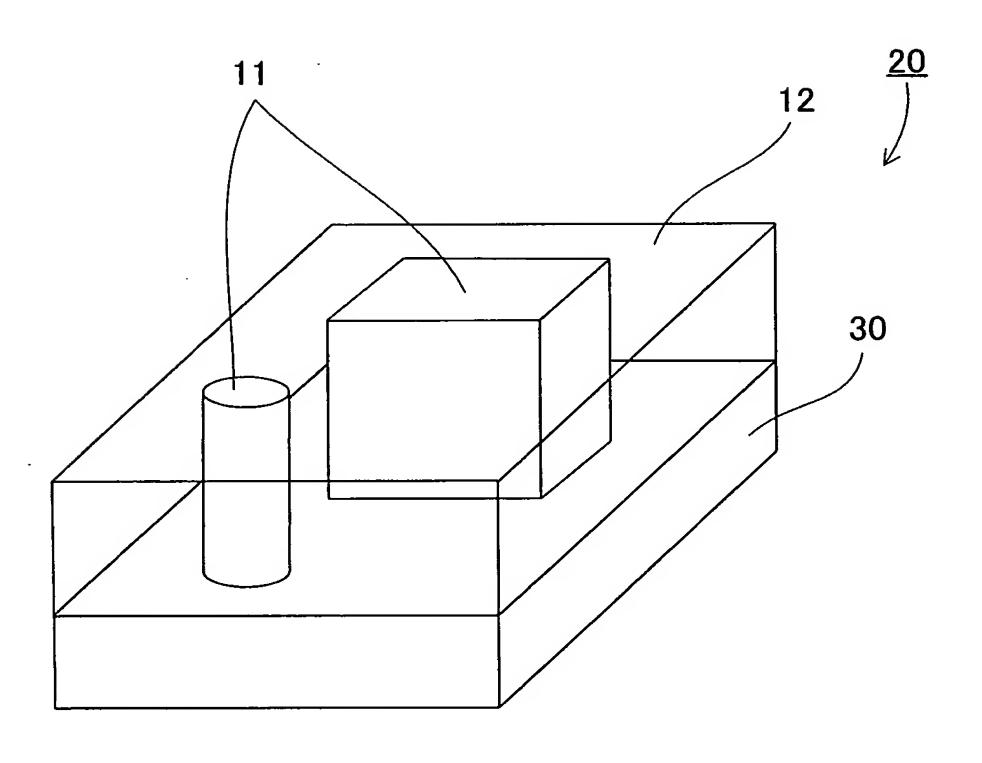


FIG. 13

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612,455,3804 Sheet 16 of 18

30-

FIG. 14

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller

Phone No.: 612.455.3804

Sheet 17 of 18

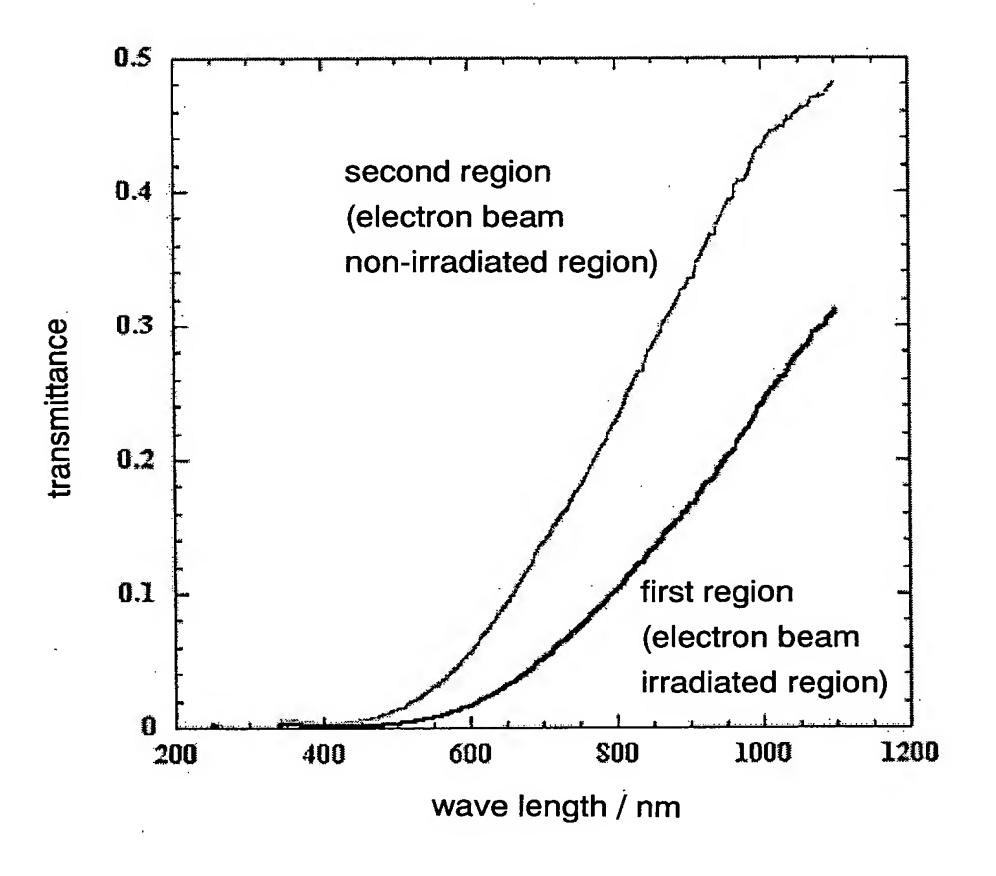


FIG. 15

Title: CARBON-BASED THIN FILM, AND PROCESS FOR PRODUCING THE SAME,

AND MEMBER USING THE THIN FILM

Attorney Name: Douglas P. Mueller Phone No.: 612.455.3804

Sheet 18 of 18

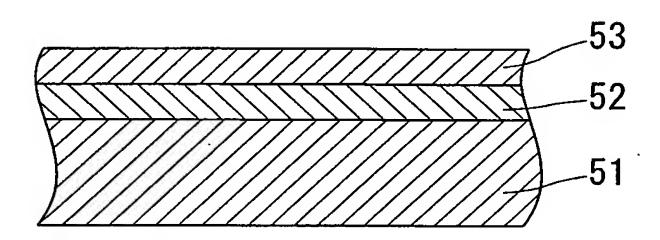


FIG. 16

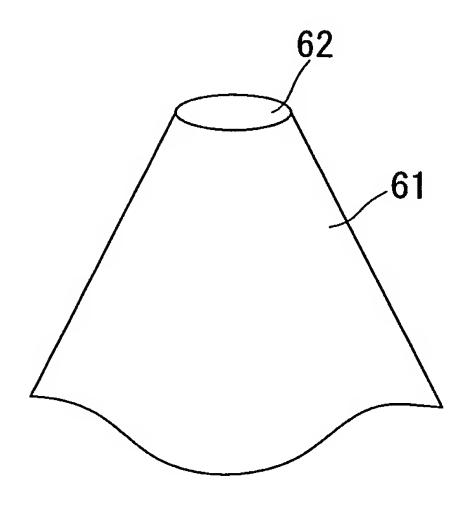


FIG. 17